Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of		
LightSquared Technical Working Group Report	)	IB Docket No. 11-109
and	)	
LightSquared Subsidiary LLC Request for Modification of its Authority for an Ancillary Terrestrial Component	)	File No. SAT-MOD-20101118-00239

COMMENTS OF LIGHTSQUARED SUBSIDIARY LLC

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In a Public Notice released on June 30, 2011,[1] the Commission requested comment on the Recommendation filed by LightSquared Subsidiary LLC ("LightSquared") in the above-captioned proceedings.[2] LightSquared's Recommendation was based on the findings of the final report of the Technical Working Group Report ("TWG Report") in this matter.[3] The TWG Report focused on the susceptibility of some GPS receivers to overload because they are not capable of rejecting signals from transmissions in bands other than the GPS band, and in particular from transmissions in the adjacent L-band that LightSquared is licensed to use for MSS and ATC.

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[1] *Comment Deadline Established Regarding the LightSquared Technical Working Group Report Public Notice*, Public Notice, DA 11-1133, IB Docket No. 11-109 (rel. Jun. 30, 2011) ("TWG Public Notice").
[2] Recommendation of LightSquared Subsidiary LLC, File No. SAT-MOD-20101118-00239 and IB Docket No. 11-109 (filed Jun. 30, 2011) ("Recommendation").
[3] The Commission also stated in the TWG Public Notice that it would entertain comments on the TWG Report itself.

I. SUMMARY

LightSquared is filing these comments in response to the TWG Public Notice. LightSquared addresses in these comments two matters upon which the GPS industry has focused since LightSquared's Recommendation was filed.

First, LightSquared addresses the suggestion by some in the GPS industry that the only way to resolve GPS overload concerns is to force LightSquared to vacate its band.[4] This suggestion, which represents a retreat from previous positions taken by these very same parties,[5] is unfortunate and counterproductive at a time when the Commission is devoting significant resources to balancing the legitimate interests of the users of two adjacent bands – the L-band and the GPS band.

Second, LightSquared shows that the GPS industry's overload analysis with respect to general location and navigation devices is faulty. The industry is using an interference threshold that is inappropriate, because it classifies GPS devices as experiencing overload in cases in which, from an end user's perspective, the devices are functioning properly. In addition, the industry relies on a propagation model that is incorrect, because it assumes there are no natural or manmade obstructions or reflecting surfaces between ATC base stations and GPS receivers when in fact such conditions exist in the real world and are better-reflected through known propagation models used by LightSquared.

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[4] *See* U.S. GPS Industry Council, Overview of the Final Report of the Working Group Established by the FCC to Study Overload/Desensitization Interference on GPS Receivers and GPS-Dependent Applications from LightSquared Terrestrial Broadband Operations ("USGIC Comments"), FCC File No. SAT-MOD-20101118-00239 and IB Docket No. 11-109 (filed July 1, 2011), at 11.

[5] *See* Recommendation at 5-6 & ns.6 and 7.

LightSquared also summarizes in these comments the showings made in its Recommendation. LightSquared has developed a three-part solution to the GPS overload issue. Under this solution, LightSquared would reduce its terrestrial base stations' power below that for which it is authorized; agree to a standstill on using the upper 10 MHz of its L-band downlink frequencies; and initiate commercial operation using only the lower 10 MHz of its L-band downlink frequencies.[6] This solution would resolve the overload issue for over 99% of existing GPS devices, and LightSquared has proposed a variety of measures that would accommodate the relatively few remaining wideband GPS receivers that might be affected.[7]

II. PROHIBITING LIGHTSQUARED FROM OPERATING TERRESTRIALLY IN ITS LICENSED BAND IS NOT A SOLUTION.

Some in the GPS industry have asserted that "the only feasible option is relocation of LightSquared's terrestrial operations" outside of the L-band.[8] The industry's ever-hardening position – accompanied by a vitriolic lobbying campaign against LightSquared – is puzzling, unhelpful, and wrong on multiple levels:

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[6] *See* Recommendation at 24. The recommendation to limit initial operations to the lower 10 MHz of LightSquared's licensed L-band downlink frequencies is similar to what the GPS industry proposed less than a year ago. *See* note 12, *infra*.

[7] *See* Recommendation at 27-36.

[8] USGIC Comments at 11. Sam Allen, who is the Chairman and CEO of John Deere, expressed a similar sentiment in a letter to Sanjiv Ahuja, Chairman and CEO of LightSquared, dated July 1, 2011.

- it ignores the fact that the GPS industry participated in the development of the technical rules under which LightSquared will operate; negotiated the out-of-band emissions limits that are reflected in the rules; and urged that the Commission grant LightSquared's ATC application "as soon as possible," stating that LightSquared was "to be commended for its proposal to use its spectrum in a responsible manner";[9]

- it is premised on a claim that the GPS industry had no way of knowing its receiver design needed to take into account the potential deployment of large numbers of terrestrial ATC stations, a claim that the GPS industry's contemporaneous statements and the Commission's findings directly contradict;[10]

- it takes no responsibility for the GPS industry's failure to develop receivers that could operate properly under the technical rules the industry negotiated with LightSquared;

- it ignores the $4 billion that LightSquared has invested, in reliance on the technical rules it negotiated with the GPS industry, to develop a state-of-the art mobile broadband network;

- it calls into question the sincerity of the GPS industry's stated willingness to work cooperatively with the Commission and LightSquared to reach a collaborative solution to the receiver overload issue;[11]

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[9] Letter from USGIC to FCC, FCC File Nos. SAT-MOD-20031118-00333 *et al.* (Mar. 24, 2004). In its letter, USGIC indicated that the OOBE limits that had been agreed to "ensure[] the continued utility of GPS receivers operating in the vicinity of MSV ATC stations." *Id.* USGIC also stated that expeditious grant of the ATC application "would validate MSV's adherence to best commercial practices" and would "advance the public and national interests in promoting the responsible use of spectrum." *Id.*

[10] In a 2003 FCC filing, USGIC stated that the limits it had agreed to with LightSquared in 2002 were necessary to protect GPS against "[t]he increased user density from potentially millions of MSS mobile terminals operating in ATC mode . . . [and] ***potentially tens of thousands of ATC wireless base stations***." Reply Comments of USGIC, IB Docket No. 01-185, at 2 (filed Sep. 4, 2003) (emphasis added). *See also Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz,* ET Docket No. 10-142, Report and Order, FCC 11-57, ¶ *28* (rel. Apr. 6, 2011) ("*MSS Spectrum Order*") ("extensive terrestrial operations have been anticipated in the L-band for at least 8 years").

[11] When USGIC first surfaced this issue less than a year ago, it stated:

> [S]ince the introduction of ATC, working collaboratively with MSS operators of ATC in the L-band has resulted in several mutual agreements to facilitate successful operations free of harmful interference. The Council believes that collaborative solutions are available to mitigate the otherwise unavoidable harmful effects described in these Comments.
> . . . The Council looks forward to continued constructive collaboration to achieve a mutually acceptable positive outcome.

- it backs away from the GPS industry's proposed solution last September, whose primary mitigation measure matches what LightSquared proposes in its Recommendation;[12]

- it is premised on an unprecedented "squatters' rights" view of spectrum management under which the GPS industry could effectively appropriate L-band spectrum for which it is not licensed simply by deploying receivers that are incapable of filtering out L-band signals;

- it would make 40 MHz of L-band spectrum – 20 MHz of downlink spectrum plus the 20 MHz of uplink spectrum with which it is paired – unusable terrestrially at a time when the Executive Branch and the Commission have determined that the national interest requires coming up with an additional 500 MHz of spectrum for wireless broadband;[13] and

- it would establish a bad precedent for other bands (*e.g.,* AWS bands) that potentially are available for broadband purposes provided that adjacent-band technical issues can be resolved.

Comments of the U.S. GPS Industry Council, ET Docket No. 10-142, at 15 (filed Sep. 15, 2010) ("USGIC Sep. 2010 Comments"). Two-and-a-half months later, in December 2010, USGIC reiterated its intent to work cooperatively to find a solution, stating: "The Council believes that cooperative solutions continue to be available to mitigate harmful impact to existing services, as outlined in its [September] Comments . . . ." Comments of USGIC filed Dec. 2, 2010, at 9-10, File No. SAT-MOD-20101118-00239.

[12] *See* USGIC Sep. 2010 Comments, at 13-14 (USGIC proposed "[i]ntroducing new terrestrial broadband transmitters as far from [the RNSS L-1 band at 1559-1610 MHz] as possible" and having a "modest amount of margin around the edge of satellite services to protect their fundamental operations and utility to . . . L-band RNSS services and devices").

[13] *See, e.g.,* Connecting America: The National Broadband Plan, Federal Communications Commission (March 2010), at 84, available at http://download.broadband.gov/plan/national-broadband-plan.pdf (recommending that the Commission make 500 megahertz newly available for broadband use within the next 10 years).

III. GPS INDUSTRY REPRESENTATIVES ARE USING AN INAPPROPRIATE INTERFERENCE THRESHOLD AND AN IMPROPER PROPAGATION MODEL.

LightSquared demonstrated in its Recommendation that its operations in the lower 10 MHz band are compatible with all general location and navigation GPS devices.[14] Some GPS industry representatives have questioned LightSquared's conclusion.[15] These parties' assertions are not based on any disagreement regarding the TWG's selection of the receivers that were tested, its test methodology, the operation of the labs that did the testing, or LightSquared's characterization of the prevalence of different user device types in the market. Rather, the assertions are rooted in the different interference threshold and propagation modeling used by LightSquared and by GPS representatives in the portion of the TWG Report addressing general location and navigation GPS devices.[16]

As shown below, the interference threshold relied on by the GPS representatives is inappropriate, because it classifies GPS devices as experiencing overload in cases in which, from an end user's perspective, the devices are functioning properly. Similarly, the propagation modeling used by the GPS representatives is incorrect, because it assumes there are no natural or manmade obstructions or reflecting surfaces between ATC base station and GPS receiver when in fact such conditions exist in the real world. Accordingly, the GPS representatives' analysis should be rejected.

A useful measure of the threshold at which a GPS receiver may experience overload is the increase in the background noise floor (as measured by the relative

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[14] *See* Recommendation at 10-13.
[15] *See, e.g.,* USGIC Comments at 4-5 & n.5.
[16] *See* TWG Report, Section 3.3 (General Location/Navigation Sub-Team).

reduction in C/N_0 reported by the GPS receiver[17]) that occurs in the presence of a LightSquared signal. The GPS industry representatives are using an interference threshold of 1 dB C/N_0; LightSquared is using an interference threshold of 6 dB C/N_0.[18]

This distinction is critical. If LightSquared's more realistic figure is used, then when LightSquared is operating in the lower 10 MHz of its uplink band, no overload is predicted for any general location and navigation devices, which account for approximately 100 million of the GPS devices in use. If the GPS industry representatives' needlessly conservative and unrealistic figure is used, then overload is predicted for some of these devices.

While an appropriate interference threshold has never been established for general location/navigation devices, it is only logical that such a threshold should relate to a perceptible change in device performance from an end-user's perspective. Using a 1 dB C/N_0 interference threshold is inappropriate, and unduly conservative, because the TWG Report test results show that a change of this magnitude does not result in any appreciable change in the device performance from an end-user's perspective, especially given that the received signal levels of the GPS satellites are themselves dynamic variables with a range much greater than 1 dB. Tests performed by the TWG with recorded GPS signal levels in both urban areas and open terrain show that it would be virtually impossible for the user to distinguish (based on the position report

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[17] The GPS receiver sees the effect of adjacent band overload as a degradation in signal quality and reports it as an equivalent degradation in C/N_0, even though LightSquared's base stations do not transmit on the GPS frequencies of 1559–1605 MHz and comply with the FCC requirements for OOBE in the GPS band.

[18] *See* TWG Report, Section 3.3, GPS Industry Perspective.

errors) between a degradation caused by GPS signal level variation and the presence, or otherwise, of a LightSquared signal causing a 1 dB degradation in the reported C/N_0.

In other words, those results show no material difference between the performance of GPS receivers experiencing a 1 dB increase in the noise floor and GPS receivers experiencing a 6 dB increase in the noise floor.[19] The parties should not be using an interference threshold that is not borne out by the test results.

LightSquared and GPS industry representatives also differ on the appropriate use of propagation models. These models take into account the fact that obstructions and reflecting surfaces attenuate LightSquared's signals before they reach GPS receivers.

The GPS industry representatives' propagation model assumes "free space" conditions, *i.e.,* assumes that there are no natural or manmade obstructions or reflecting surfaces between ATC base station and GPS receiver. The use of a free space model improperly skews the results, because in the real world attenuation does occur.

LightSquared, on the other hand, employed widely-used and conservative propagation models such as Walfisch Ikegami Line of Sight and Korowajczuk. These models show that the areas in which LightSquared's ATC base stations will produce a power at the GPS device antenna of -25 dBm or more (referenced to a 0 dBi antenna) are very limited, given LightSquared's actual deployment sites and antenna heights. In the Washington, D.C. market, for example, the WI-LOS model predicts a signal strength of more than -25 dBm in no more than 1.2 percent of the area and the Korowajczuk model

[19] The tests measured the performance of GPS receivers in dynamic driving conditions. *See* TWG Report, Section 3.3, LightSquared Perspective.

predicts that level in no more than 0.1 percent of the area.[20] The propagation models used by LightSquared, because they reflect real world conditions, are the appropriate models.

IV. SUMMARY OF SHOWINGS AND PROPOSED SOLUTION SET FORTH IN LIGHTSQUARED'S RECOMMENDATION.

The remainder of this submission provides a summary of the showings made in LightSquared's Recommendation and of the solution proposed by LightSquared therein.

A. THE OVERLOAD PROBLEM FOR LEGACY GPS RECEIVERS IS LIMITED TO LIGHTSQUARED'S INITIALLY-PROPOSED OPERATIONS IN THE UPPER 10 MHz OF LIGHTSQUARED'S LICENSED SPECTRUM; LIGHTSQUARED'S OPERATIONS IN THE LOWER 10 MHz IN WHICH LIGHTSQUARED HAS PROPOSED TO COMMENCE OPERATIONS ARE COMPATIBLE WITH OVER 99% OF GPS RECEIVERS.

The test results summarized in the TWG Report demonstrate the following:

First, while the results vary by device, a significant number of legacy GPS receivers would be susceptible to overload in the presence of LightSquared operations in the upper 10 MHz of its downlink frequencies (1545.2-1555.2 MHz).[21] For this reason, LightSquared has committed to a standstill period during which it will not deploy the upper 10 MHz of its licensed downlink spectrum for terrestrial operations.[22]

Second, LightSquared's operations in the 10 MHz of its downlink band (1526-1536 MHz) that is furthest from the GPS band are compatible with over 99% of GPS

[20] *See* TWG Report, pp. 153-154.
[21] *See* Recommendation at 9.
[22] *See* Section IV.D, below.

receivers.[23] In this portion of the band, there is 23 MHz of separation between the band edge of LightSquared's highest base station frequency (1536 MHz) and that of GPS's lowest frequency (1559 MHz). The limited number of GPS devices that experience overload are certain precision devices largely used in precision agricultural and mining, and construction, generally in non-urban settings, where receivers have been specifically designed to receive signals from the L-band frequencies in which LightSquared is authorized.[24]

Finally, in all cases, overload occurs only because legacy GPS receivers are unable to reject sufficiently the transmissions that LightSquared's base stations emit on LightSquared's licensed frequencies, not on GPS frequencies.

B. THE OVERLOAD ISSUE IS OF THE GPS INDUSTRY'S OWN MAKING AND COULD HAVE BEEN AVOIDED.

LightSquared demonstrated in its Recommendation that the overload issue is one of the GPS industry's own making and could have been avoided.[25] The very fact that so many GPS receivers experience no overload when LightSquared is transmitting is reflective of the fact that when problems do occur, it is neither a necessary function of the adjacency of the spectrum nor of LightSquared's transmissions, but of the failure in design of many legacy GPS receivers to reject signals transmitted outside of the GPS band.

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[23] *Id.* at 10, 27-29.
[24] *Id*. at 4, 29-30.
[25] *See* Recommendation at 17-20.

The problem results from legacy GPS receivers being designed, in some cases deliberately, and, in the best case, inadvertently, based on an assumption that there would never be adjacent-band terrestrial transmissions. This assumption fails to take into account regulations that had been adopted, with the active participation of the GPS community, to permit just such transmissions. Had GPS device manufacturers employed filters, whose cost could have been as low as $0.05 per device, beginning at the time that terrestrial operations were permitted in the L-band, the entire problem could have been avoided.

The GPS manufacturers effectively are seeking to appropriate LightSquared's licensed L-band spectrum. They chose not to design their receivers to filter out signals from adjacent, licensed L-band frequencies. In some cases, GPS manufacturers even intentionally designed their receivers to receive signals from across the MSS L-band. These design decisions exposed GPS customers to overload, and based on this overload the GPS manufacturers now are asking the Commission to prevent LightSquared from using its licensed spectrum. Rather than attempting to make LightSquared bear the consequences for their design choices, the GPS manufacturers need to take responsibility for their actions.

C. LIGHTSQUARED MUST BEGIN DEPLOYMENT OF MOST NEEDED WIRELESS BROADBAND SERVICES.

While LightSquared does not question the importance of GPS services, the GPS community ignores the vital benefits to public welfare, public safety, and economic

developed to be derived from the deployment of LightSquared's wireless broadband networks at a critical time in the nation's history. These benefits include the following:

First, LightSquared's network would provide terrestrial wireless coverage to at least 260 million people by the end of 2015. Through the operation of a combined satellite and terrestrial network, LightSquared's network will make broadband services available to Americans in all parts of the country, urban and rural, helping to close the digital divide between urban and rural America and providing uninterrupted service to first responders and others, even during major power outages and other emergencies.

Second, LightSquared's network would create not only another facilities-based provider of wireless broadband services in an otherwise increasingly concentrated market, but one committed to a wholesale only model. That model will enable multiple entities – retailers, rural and other geographically limited communications service providers, cable operators, device manufacturers, online content providers and others – the opportunity to provide wireless broadband services to their customers.

Third, LightSquared's network, which will require more than $25 billion of investment, will invigorate the U.S. economy with jobs, innovation, and services, and is estimated to contribute $120 billion in benefits to U.S. consumers.

LightSquared cannot achieve these goals until it is able to move beyond the planning stage and begin deploying its network. Resolution of the GPS overload issues is an essential prerequisite to bringing the benefits discussed above to the American public.

D. LIGHTSQUARED'S PROPOSED SOLUTION

In its Recommendation, LightSquared proposes a three-part solution:

First, LightSquared will operate its base stations at a significantly lower power than permitted under its FCC authorization and under agreements it has negotiated with other satellite system operators with which it shares the band.

Second, LightSquared will agree to a standstill period during which it will not deploy the upper 10 MHz of its licensed spectrum for terrestrial operations.

Third, LightSquared will commence terrestrial operation only in the lower 10 MHz portion of its spectrum.

It should be understood that LightSquared's proposed solution requires large expenditures by the company. Limiting itself to the lower 10 MHz entails a cost to LightSquared of over $100M in renegotiation, reengineering, and reconfiguring its wireless channels. However, even though LightSquared has already committed to investing tens of billions of dollars going forward on its network, it is willing to bear this additional expense and disruption in order to move forward immediately with its network.

Under its proposed solution, LightSquared would commence terrestrial operations 23 MHz away from the bottom of the GPS band. This separation is sufficient that most GPS receivers, including those without adequate filters, would not be susceptible to overload.

Moreover, the limited number of precision measurement GPS receivers which have been deliberately designed to "listen in" to L-band frequencies can co-exist with

LightSquared through, among other measures: (i) frequency coordination, benefitted by the fact that most legacy precision GPS devices operate in rural areas that are highly unlikely to be near a LightSquared base station; (ii) design of future GPS receivers to operate on pre-selected frequencies at the furthest edge of the GPS band; and (iii) use of a multimode (satellite-terrestrial) module or cellular or PCS band modem for the GPS augmentation link. LightSquared has committed further to work with GPS manufacturers, Inmarsat, and filter manufacturers to put arrangements in place to address and resolve the limited overload issues that might occur for this kind of GPS equipment going forward.

In short, LightSquared's proposal resolves the overload issue for GPS receivers.

CONCLUSION

The spirit of cooperation, the effort to reach a compromise, and the recognition of the need for a solution whereby two valuable services – GPS and desperately needed new terrestrial broadband services – might co-exist, has been replaced by a stone wall strategy, and a refusal of the GPS industry to take any responsibility for a problem almost entirely of its own making.

This zero sum approach should be rejected, and LightSquared respectfully requests that the Commission move expeditiously to implement the solution LightSquared has proposed.

Respectfully submitted,

/s/ Jeffrey J. Carlisle
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August 1, 2011

ATTACHMENT A

JOHN DEERE

Deere & Company World Headquarters
One John Deere Place, Moline, IL 61265 USA

Samuel R. Allen
Chairman and Chief Executive Officer

1 July 2011

Mr. Sajiv Ahuja
Chairman & CEO
LightSquared
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Reston, VA 20191

Dear Sanjiv:

I appreciate your comments on LightSquared's commitment to find a safe, responsible, fair and cooperative way to resolve the GPS interference issues created by your proposed network. I want to assure you this is a major issue for our Company and our customers. To this end, I am receiving regular updates on its technical challenges, customer and business impacts, and policy implications, so I am involved in this issue.

Based on the inputs of our engineering and government affairs groups, I must disagree with your assessment that your latest proposal largely addresses the GPS interference issues. Our own assessment has been reinforced by the recent GPS Coalition report and press release indicating that your latest proposal still poses significant problems for general GPS usage, as well as high-precision receivers like we use in our industry. I would also like to point out that your comments on development of filtering technology do not provide a viable solution for the large base of currently-installed GPS receivers and equipment. If such filtering technology is feasible, we know from our extensive experience in this field that it will take years of development and testing to ensure that comparable performance to current technology can be achieved.

I also appreciate your offer to have me contact you directly, however, I do not see value in our engaging in direct discussions I note that our respective engineering teams worked together closely as part of the Technical Working Group chartered by the FCC; company representatives met in person at our Washington Office a few months ago; our CIO, Barry Schaffter, and your Executive Vice President, Martin Harriman, discussed this issue on a conference call; and we entered into a Non-Disclosure Agreement (NDA) and shared with your technical team more details about our receivers. I am satisfied that these activities represent a comprehensive effort on Deere's and LightSquared's part to evaluate this issue.

I understand that the network you are proposing might bring additional broadband services to rural America, and John Deere is in favor of that overall objective.

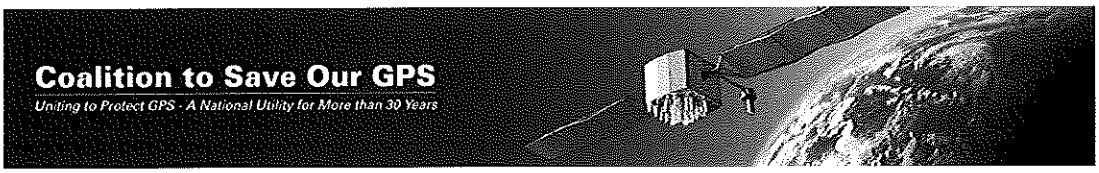
However, we are not in favor of doing this in a manner that will interfere with existing GPS usage, either with our customers or the general public.

If your technical team identifies new information, then of course our engineers will be interested in discussing that with you. Otherwise, we do not believe that there is a practical solution to avoid, or substantially mitigate, the interference caused by your proposed system, either in its original state or the new revised form. Because of the severe impact your proposed network will clearly have on our customers, John Deere will continue to oppose the network and request that the FCC rescind its conditional approval of LightSquared's plan.

Sincerely,

Sam Allen

jla
Enclosure
c: B. W. Schaffter
C. R. Stamp



LightSquared's Proposed "Solution" to GPS Issue is a Non-Starter

Would Cause Harmful Interference for Millions of GPS Users

LightSquared sought quick FCC action on its plans to deploy 40,000 ground stations and a tight deadline for conducting the industry's Technical Working Group study on the problem of interference with GPS signals. But LightSquared then asked for postponement of the deadline for completing the interference study and unilaterally – before either completion or submission of the study – announced its so-called "solution" for it. All this came out of the blue, without the knowledge, agreement or consensus of the industry group studying the problem.

That may well be because virtually nothing has actually changed in this "new" proposal relative to what LightSquared pledged at the outset of testing. The power levels don't change. Nor do the frequencies. In fact, the only thing that has changed is the ***order*** in which the channels within the band adjacent to GPS would be deployed.
LightSquared's announced "solution" has two components:

- LightSquared acknowledges that "[e]arly test results indicated that one of LightSquared's 10MHz blocks of frequencies poses interference to many GPS receivers." LightSquared states that for "the next several years" it would not operate in this band – which is directly adjacent to GPS spectrum and is referred to as the "upper MSS band." During this period, LightSquared would commence operations in a second 10 MHz block of the MSS band, referred to as the "lower MSS band," slightly further away from GPS.

- "LightSquared will modify its FCC license to reduce the maximum authorized power of its base-station transmitters by over 50 percent. This action will limit LightSquared to the power it was authorized to use in 2005."

But this hastily-arrived-at, Hail Mary "solution" – devised before the study group's findings were in and contained in a two-page news release that cites no credible, independent validation of its claims – is not a solution in any shape, form or fashion.

LightSquared's "solution" is not a move to an alternative frequency band. Nor is it a reduction in power relative to what has been tested from the beginning. The "solution" would cause massive disruption to millions of Americans in their everyday lives as well as to many critical U.S. economic sectors, later followed – after "the next several years" – by even more interference to more GPS users. The conclusion from the information below is inescapable: ***The only real solution to the LightSquared interference problem is to move out of the MSS band altogether.***

1) LightSquared's claim that lower band operations would be largely free of interference for non-high precision GPS users is simply not true.

LightSquared states in its news release "solution" that the "test results show this lower block of frequencies is largely free of interference issues with the exception of a limited number of high precision GPS receivers. . . ."

This is simply not true, and LightSquared should have known better from its involvement in the FCC working group. Because LightSquared initially insisted on operating in both the upper and lower MSS bands, despite substantial evidence of interference, most of the tests conducted looked at this scenario, so only limited test results for lower band-only operations are available. So even for those sectors where reduced interference in the lower-band was found, the results are limited and inconclusive.

For many other sectors, and not just high precision GPS, these limited lower-band test results actually show significant interference to most of the devices that were studied. For example, the "general navigation" subgroup

found the following: "Lab testing revealed that many devices suffered from harmful interference from the lower 10 MHz channel; specifically, 20 out of 29 devices experienced harmful interference."

What this means is that the actual test results show that the majority of the GPS devices upon which tens of millions of Americans rely for navigating their cars, trucks and boats, and finding their location whether traveling in cities or hiking in the wilderness would suffer significant interference.

Similarly, independent government tests found that "GPS loss of function still occurs at unacceptable distances to LightSquared towers" for a variety of the receivers studied. Against these results, LightSquared offers only self-serving assertions in a news release, without any credible, independent support.

2) Even LightSquared admits that operation in the lower MSS band will not solve the interference problem for high precision uses. It fails to note that the harmful interference rate is 94 percent and the critical importance of those high precision users.

LightSquared's own release states that lower MSS band operations ***would*** interfere with high precision GPS receivers. It does not reveal that the study group tests show that 94 percent of all high precision receivers tested suffered harmful interference. And just who are the high precision GPS users LightSquared blithely dismisses as just a "limited number"? As detailed farther below, all are in industry sectors vitally important to the U.S. infrastructure and economy: agriculture, aviation, construction, engineering, surveying, marine navigation and disaster monitoring as well as federal, state and local government uses.

LightSquared's plan to initiate operations in the lower MSS band would immediately create severe disruption to all of these many vital and critically important sectors. A recent economic study found that in the last five years alone, high precision GPS uses accounted for $10 billion in private investment in GPS equipment, a figure that does not include the many billions of dollars of governmental investment in GPS in its 30 years of existence. The same study estimated that these private uses generated $30 billion of economic benefits per year.

3) LightSquared's proposal to "reduce" its permitted operating power actually represents an *increase* in power above the levels shown to create interference in recent tests.

From the very beginning of the interference testing, LightSquared has stated that is does not seek to use the extremely high 15,850 Watt power level authorized in 2010, but instead to radiate lower aggregate levels of around 1,600 Watts. So, its proposal now to "reduce power" is therefore a classic "sleeves off the vest" offer: a concession that doesn't actually cost LightSquared anything. All interference testing – and all harmful interference observed in the testing – was conducted at these 1,600 Watts reduced power levels. The new proposal to "reduce" the power limit from the higher 15,850 Watts by 50 percent is actually an ***increase*** over what was tested, based on LightSquared's stated intentions, at both the White Sands Missile Range and Las Vegas interference tests. This "reduction" does not provide any additional protection to GPS over what has been tested and proven to cause harmful interference. In fact, the reduction is more likely to be an increase in power over what was tested. At higher power levels than those tested, the interference problems would be even more devastating than those already observed.

4) **LightSquared is still proposing to operate in the upper MSS band in the future, despite overwhelming evidence of massive interference and no credible support for any future technical solution.**

The proposal is not a change to the frequencies; it simply changes the order in which they would be deployed. Every technical study performed to date shows massive interference to all types of GPS receivers from operation in the upper MSS band. The evidence on this point is overwhelming and there is no credible technical fix available now or projected in the future. The one billion or more times difference in power levels between the intentionally faint GPS signals and the vastly higher-powered LightSquared signals, as well as the extremely close proximity to GPS spectrum, present fundamental physics issues that LightSquared cannot resolve.

LightSquared has put forward absolutely no credible, independent evidence that there is a technical fix for this interference now or will be in the future. Instead, it has offered up only self-serving predictions. LightSquared should never have even proposed operations in this spectrum in the first place, a proposal that has wasted the time, money and effort of so many companies, individuals, and taxpayer-funded governmental agencies and departments.

CRITICAL HIGH PRECISION USES

Agriculture: Hundreds of thousands of U.S. farmers use high precision GPS to increase crop yields, while reducing the costs and environmental impact of fuel and chemical usage. The United States leads the world in GPS-enabled precision agriculture. The technology enhances the international competitiveness of the U.S. agricultural industry and helps close the gap in global agriculture necessary to feed a growing world population. The Technical Working Group test results show devastating interference to these systems – including in the 10MHz lower block and power levels of the new "solution" – which would severely impact a $160 billion U.S. industry employing more than half a million people. The National Association of Wheat Growers estimates that its members alone have invested $3 billion in high precision GPS equipment and estimates of the benefits to the U.S. economy of precision GPS agriculture are in the order of tens of billions of dollars annually.

Aviation: The RTCA aviation report did *not* conclude that the 10 MHz block of frequencies at the lower end of the band adjacent to GPS was free of interference; it only recommended more study in this area. Tests were conducted at the reduced power levels.

Construction, Engineering & Surveying: Hundreds of thousands of users in these industries depend on high precision GPS to precisely guide construction machinery – saving time, fuel costs and improving safety. The same efficiencies are available in the engineering and surveying services industries, which are vital to the construction, land management, energy, oil and gas industries. Billions of dollars have been invested in high precision GPS in these industries, by tens of thousands of companies employing hundreds of thousands of workers. These companies include many small businesses whose owners question whether they will be able to stay in business if high precision GPS is disrupted. From Day One, the new "solution" would cause severe disruption and damage to these vital industries.

Federal, State and Local Governments: High precision GPS is used extensively in the mapping, maintenance and administration of our national assets, critical infrastructure, environment and public lands. High precision GPS users in the U.S. departments of Interior, Defense, Agriculture, Homeland Security and Transportation, as well as state departments of transportation, cities and counties would suffer serious disruption to their work and increased costs as a result of the deployment proposed in the LightSquared "solution," also from Day One.

Maritime Services: Global Maritime Distress and Safety Systems (GMDSS) built to International Maritime Organization standards suffered complete loss of both GPS and satellite communications during testing of the LightSquared signal, including at the power levels and frequencies proposed in the "solution." These effects would likely be seen within miles of shore. High precision GPS used in dredging operations to keep U.S. ports, harbors, approaches and navigable rivers both safe and operational would also suffer be serious interference, as would high precision GPS equipment used in near shore marine construction and oil and gas operations. High precision GPS reference stations in coastal areas also provide essential Differential GPS navigation services, and would incur interference as well.

High Precision GPS Networks and Disaster Monitoring: Networks of high precision GPS receivers across the United States provide high precision GPS services to users in a wide range of industries. This includes the use of high precision GPS networks to monitor the movement of dams and other large structures, as well as the movement of earthquake fault zones and volcanoes in the Western U.S. All are designed to automatically raise the alarm in the event of potential disaster. High precision GPS is used to survey and monitor levees across the U.S. to prevent another disaster such as that caused by Hurricane Katrina. GPS networks are also used for precision lane guidance systems that enable snowplows to operate in blizzard conditions or buses to maintain their position in lanes barely wider than the bus itself.